

Prognosis after aortic valve replacement with the Carpentier- Edwards pericardial valve: use of microsimulation.

Ann Thorac Surg. 2005 Sep;80(3):825- 31.

Puvimanasinghe JP, Takkenberg JJ, Eijkemans MJ, Steyerberg EW, van Herwerden LA, Grunkemeier GL, Habbema JD, Bogers AJ.

Department of Cardiothoracic Surgery, Erasmus Medical Center, Rotterdam, The Netherlands.

j.p.a.puvimanasinghe@erasmusmc.nl

BACKGROUND: The second- generation Carpentier- Edwards pericardial valve (Edwards Lifesciences LLC, Irvine, CA) is widely used for aortic valve replacement. However, knowledge on the long- term outcomes of patients after valve implantation is incomplete. We used microsimulation to calculate the long- term outcome of any given patient after aortic valve replacement with the Carpentier- Edwards pericardial valve.

METHODS: A meta- analysis of 8 reports on aortic valve replacement with the Carpentier- Edwards pericardial valve (2,685 patients; 12,250 patient years) was used to estimate the hazards of valve- related events other than structural valvular deterioration. Structural valvular deterioration was described by age- dependent Weibull curves calculated from 18- year follow- up, premarket approval, Carpentier- Edwards pericardial primary data. These estimates provided the input data for the parameters of the microsimulation model, which was then used to calculate the outcomes of patients of different ages after valve implantation. The model estimates of survival were validated using two external data sets.

RESULTS: The Weibull analysis estimated a median time to reoperation for structural valvular deterioration ranging from 18.1 years for a 55- year- old male to 23.2 years for a 75- year- old male. For a 65- year- old male, microsimulation calculated a life expectancy and event- free life expectancy of 10.8 and 9.1 years, respectively. The lifetime risk of at least one valve- related event was 38% and that of reoperation due to structural valvular deterioration 17%, respectively, for this patient. The model estimates of survival showed good agreement with external data.

CONCLUSIONS: Microsimulation provides detailed insight into the long- term prognosis of patients after aortic valve replacement. The Carpentier- Edwards pericardial valve performs satisfactorily and offers a low lifetime risk of reoperation due to structural valvular deterioration, especially for elderly patients requiring aortic valve replacement.

PMID: 16122436 [PubMed - indexed for MEDLINE]